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ABSTRACT

This paper discusses the future of the printed book. The first section considers factors contributing to predictions of its eventual demise and replacement by electronic versions, the increasing volume of digitized material, superior characteristics of digital publications, and the development of technologies that will allow the e-book to become as portable as the printed book. This section also describes the "four B's" test of portability (i.e., the capability to be used in the bedroom, bathroom, bus, and beach), current developments, and barriers to greater usage of e-books. The second section discusses the advantages of print and evidence to support the continuation of print materials. The third section considers the library's response in terms of managing print and digital collections. The fourth section addresses the importance of a common user interface to the delivery of content in the future, and the fifth section presents key properties of the library portal. The sixth section describes the four layers (presentation, applications, protocols, and contents) of the library portal and provides a diagram of portal architecture. (MES)

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The Last Book: The Delivery of Future Content

By: Edward Lim

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ALIA 2000

Proceedings

The Last Book: The Delivery of Future Content

Edward Lim

1. THE LAST BOOK

Many extravagant predictions have been made about the future of the printed book, with most predicting its eventual demise and replacement by electronic versions available anywhere and any time on the Internet. A few quotations will give a flavour of the current thinking among some industry players:

We are at "ground zero of the most earth-shaking, tradition-breaking revolution in publishing in more than 500 years, a techtonic shift in the way books are made, bought, sold and ultimately, perhaps, rendered obsolete." (Weeks, 2000)

> Mark Bernstein of Eastgate Systems, a proponent of experimental story telling using hypertext: "The future of literature lies on the screen ."(Quoted by Weeks, 2000).
>
> Diane Grego, also of Eastgate System: "Books will become objects of nostalgia."(Quoted by Weeks, 2000).
>
> Chuck Geschke, co-founder and chai rman of Adobe Systems: "Think about it as an ecosystem; the book of the future isn't going to look anything like the static books of today." (Quoted by Lind, 2000)
>
> Edgar Bronfman Jr., the head of Universal, the world's biggest music company, predicted in a speech in May that soon "a few clicks of your mouse will make it possible for you to summon every book ever written in any language, every movie ever made, every television show ever produced, and every piece of music ever recorded." (Mann, 2000)

There is no question that the rapid developments in the global information infrastructure have been responsible for these claims. Among the factors driving these beliefs, the following are significant:

- An increasing volume of material being published in digital format;
- the superior characteristics of digital publications, especially in providing a rich multimedia environment with hypertext links and interactivity; and
- the development of technologies which will allow the digital book to become as portable as the traditional printed book.

1.1. Increasing Volume of Digitised Material

There are daily reports in the press of more and more publishers moving their publications into the digital environment. For example, scholarly electronic journals are increasing in number by leaps and bounds. Many journal publishers are starting web-based publishing programs. In some cases publishers are making all or most of their journals available on the web. Many scholarly e-journals began life as print, but are now being rapidly converted into digital formats. Publishers active in this field include the traditional large journal publishers like Academic Press, Elsevier, Springer and Wiley and scholarly societies like the American Association for the Advancement of Science, American Astronomical Society, American Chemical Society, Institution of Electrical and Electronic Engineers and the Institute of Physics. Universities and their presses are also involved, e.g. JSTOR, HireWire Press and Project Muse. In addition, many libraries and organisations are digitising their holdings of images, videos and movies, as well as collections of out of copyright works.

There are now thousands of e-journals available via the Web whereas in the past few years they only numbered in their tens or hundreds. *NewJour*, (http://gort.ucsd.edu:80/newjour/) the web site for new electronic journals and newsletters available on the Internet, lists some 9229 titles as at August 2000 (up from 2500 in 1998). Many are not peer reviewed and the total number of journals that are only available in electronic format still constitutes a very small proportion of the total number of journals published (less than 5% according to some estimates).

In the monograph area, many commercial publishers have begun to convert their publishing output to digital

form. Notable examples are Random House, one of the largest book publishers in the world, which is digitising its entire publishing output of 20,000 titles, Simon & Schuster and McGraw-Hill.

There are now a number of commercial sites that provide access to electronic books for a fee. An important enterprise is the NetLibrary (http://www.netlibrary.com), which has entered into partnership with a large number of major publishers, including Cambridge University Press and Yale University Press, to make available more than 18,000 titles in digital form. Another large initiative is being launched by Questia (http://www.questia.com) which has secured US$130 million from some large investors to digitise and provide online access to "the full text of hundreds of thousands of books, journals and periodicals, as well as tools to easily use this information." Other smaller companies like WizeUp.com and Versaware.com offer materials for college students in a digital format with advanced features such as audio and video which cost the same or less than traditional textbooks.

1.2. The Four "B's" Test

It has frequently been said that the printed book will never be replaced by an electronic book until the digital book meets the four "B's" test - that is the capability to be used in the bedroom, bathroom, bus and beach. This is the test of portability, as most access is currently managed via the desktop computer. However, an increasing number of technologies are now making it feasible in the next few years for the portability test to be met.

There are a numbers of devices that have been or are being developed which will make ebooks easier to be held, carried around and read. Handheld readers like the Softbook reader (http://www.softbook.com) and the Rocket eBook (http://www.rocket-ebook.com) would make it possible for digital books to be read like printed books. The Rocket eBook, for example, simulates many of the features of the printed book - page turning, and the ability to make margin notes, underline special passages and bookmark pages. In addition, of course, these eBook readers allow the contents to be searched. Booksellers like Barnes and Noble (http://ebooks.barnesandnoble.com/index.asp/ now sell electronic copies of books that can be downloaded to eBook readers, as well as viewed on desktop computers. Unfortunately, however, because of incompatible standards, an ebook designed for the Rocket eBook cannot be read on the SoftBook device, or on a desktop PC, and different software must be used to view ebooks on different systems.

Developments in handheld devices like PDAs (Personal Digital Assistants) and mobile phones also provide promise of delivery of information to these portable devices wherever the user is located. Currently, two standards are competing for market share. The Wireless Applications Protocol (WAP) is being developed mainly in Europe and the USA as the Internet standard for wireless devices. The protocols are optimised for the narrow bandwidth and limited memory and CPU usage of handheld devices. In Japan and East Asia, another protocol for mobile phones has been developed by DoCoMo, Japan's leading cellular phone operator. Launched in 1999, the I-Mode (for Information Mode) is a mobile phone service that offers continuous Internet access using voice and packet communication protocols and networks. Users do not pay for this continuous access unless they download information from specially formatted websites which have been designed to fit into the screen of the mobile phone.

Currently, the barriers to greater usage of these devices are the limited number of ebook titles available, the relatively poor screen resolution and high price. The number of ebook titles is increasing, and there are now several thousand available. The high price will obviously come down with greater usage and improvements in the technology.

The poor resolution of screens is a more difficult problem to resolve. A lot of research is going on in this area, and a couple of developments offer some promise for the future.

The Microsoft Reader software designed for reading ebooks on PCs and laptops claims to improve screen resolution considerably, and is available free of charge for purchasers of ebooks from Barnes and Noble.

Another development is digital ink, or to use its commercial product name, E-Ink (http://www.eink.com). The "ink"itself is a liquid which can be printed on any surface. The ink can be printed onto very thin plastic film and laminated to a layer of electronic circuitry. Thus the display panel can be no thicker than a sheet of cardboard. When an electric charge is applied, a pattern of pixels is formed to display an image or letter. The information produced is dynamic, and can be changed via satellite or other wireless transmissions. This means that the user can constantly receive updated information on the E-ink panel. This E-ink technology can be used for a number of applications, including handheld devices, outdoor billboards and electronic books. E-ink has many superior features. An electronic ink display has the high resolution qualities of ink on paper. It can be printed on almost any surface, and will permit prolonged battery life because it consumes very little power. However, the product is still a few years away from universal use, and has so far only been targeted at the retail market for sign displays.

A similar product is being developed by Xerox PARC which the company calls electronic reusable paper. This display technology called Gyricon, has many of the properties of paper, except that it is "electrically writeable and erasable." (http://www.parc.xerox.com/dhl/projects/gyricon/) The display also relies on an electric charge to create images such as text and pictures.

While these technologies are still some years away from being widely marketed, they hold the promise of being able to produce screens with the resolution of print on paper. When that happens, the great barrier to popular acceptance of ebooks may disappear.

2. REPORTS OF MY DEATH ARE GREATLY EXAGGERATED (Mark Twain, 1897)

"The death of print and public libraries has been suggested several times in the past, when motion pictures, radio, and television became popular. Then as now, new media built their own markets - enhancements not replacements." (Crawford & Gorman (1995, p.34).

The authors point out that there are many advantages of print. The first is obviously that reading from the screen is still troublesome, and no electronic medium can yet compare with ink on paper for readability (although the technological developments described above may change this in the next few years). The linearity of text is not necessarily a disadvantage as it is good for "building understanding and enlightenment and for story telling. Most nonreference books would not benefit from hypertext." (ibid,p.35). It is generally accepted that electronic versions of reference books like encyclopaedias and dictionaries have distinct advantages over their printed counterparts.

"Books that are both public and intimate - the kind that are read in the bathroom or on the beach, in the subway or on the sofa - those books will not all go to modem. Good books are not the stuff of fly-by-night technology. They fit our hands, our brains and bodies, and we'll continue to insist that they do." (Allan Kornblum. Quoted in Crawford & Gorman, 1995, p.19).

"We shall not understand what a book is, and why a book has the value many persons have - Words on a screen have visual qualities, to be sure, and these darkly limn their shape, but they have no materiality, they are only shadows, and when the light shifts, they'll be gone. Off the screen, they do not exist as words." (William H. Gass, Director of the International Writers Centre at Washington State University, St Louis, "In Defense of the Book", Quoted by Weeks, 2000)

Brown and Duguid (2000) have pointed out that paper documents have proved more resistant to extinction than any one has expected. This is largely because the document is more than an "information carrier". Documents also have the following "social" characteristics:

- Documents give validity (or warrant) to the information. People determine the reliability or otherwise of the information on the basis of a number of factors, e.g. the author or publisher of the document.
- Documents have a "social role". Long before the development of "virtual communities" on the Net, scholars like Anselm Strauss, a sociologist, and Benedict Anderson, a political scientist, studied communities forming around documents (including books and newspapers). These were "textual communities" whose shared interest in texts gave rise to the "notion of a discipline, a profession, or an interest group." (Brown and Druid, 2000, p.190)

Borgman (2000, p.x) in her recent book is critical of the hype surrounding the emerging global information infrastructure. She points out that "History shows that, time and again, new technologies have supplemented rather than supplanted, old ways of doing things." She also feels that there is too much focus on technology and not enough attention is paid to human behaviour. In other words, the technology may be available, but will people use it?

There is considerable evidence to support the truism that printed books will not disappear forever. For one thing, there are the legacy collections in libraries comprising several hundred million books. Some writers have argued that these could be selectively digitised over time. But they have not reckoned with the cost and the time required to undertake this mammoth task. For example, Crawford and Gorman (1995) estimate that based on the Library of Congress's experience, LC can convert around 1,000,000 images (or pages) each year. This is equivalent to 5,000 200-page books. Based on the size of its current collection, even if LC were to stop acquiring books today, it would have converted only 5% of its collection by the year 2216.

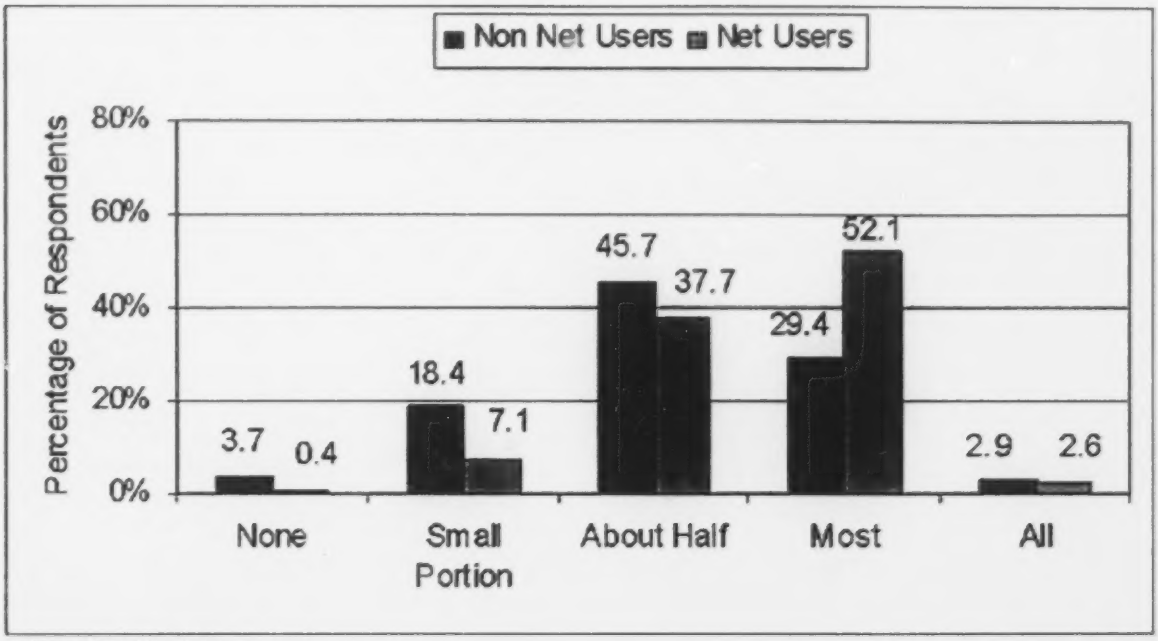
There is also statistical evidence to support the continued good health of print. According to the *Unesco Statistical Yearbook, 1999*, more than one million print titles are published annually. The *Yearbook* also records that the consumption of printing and writing paper worldwide between 1970 and 1997, rose from 7.2 kilograms

per head in 1970 to 15.1 kilograms per head in 1997. Consumption of newsprint also rose from 21 million tons in 1970 to 35 million tons in 1997. Again, book sales in the USA, as reported by the American Booksellers Association, increased from US$12.688 billion in 1997 to US13.179 billion in 1998.

A recent "UCLA Internet report - Surveying the Digital Future", issued by UCLA's Center for Communications Policy, shows that people still rate books as important sources of information. To a question "How important are the following as sources of information to you?" 73.1% of Internet users and 67.4% of non-Internet users rated books as being important or extremely important. (See Fig below)

How much of the information on the Internet do you think is reliable and accurate?

Non Net Users versus Net Users*



* Respondents 16 and over

Source: The UCLA Internet Report – Surveying the Digital Future"
UCLA Center for Communication Policy

3. THE LIBRARY'S RESPONSE

From a library perspective, it is clear that for the foreseeable future, print will coexist with electronic publications, with each being used for purposes which best reflect their respective strengths. In managing both digital and print collections, librarians will continue to rely on their professional skills to select the materials which meet the needs of their users, and to make decisions such as when to substitute digital for print, the balance between ownership and access, the advantages of local hosting of databases versus hosting by a third party or vendor, and how to archive and preserve digital and analogue materials. A key decision will be the integration of access to analogue and digital materials so that users can operate within a seamless information space. In this environment, users will be provided with a common interface to discover the resources (both analogue and digital) that they want, and to have these delivered to them, wherever they are located. The success of this strategy will be dependent on the acceptability of this technology and, in turn, this will be dependent on how easy it is to use, how affordable it will be and whether it meets the perceived needs of

users.

4. COMMON USER INTERFACE

The development of a common user interface is critical to the delivery of content in the future. In the traditional print based library, the online catalogue (OPAC) provides a common interface to all of the library's locally held analogue resources. But with the increasing move towards digital libraries, the issue of a common user interface becomes more complex. This is partly because the range of information resources available to users is more disparate, and comprises analogue as well as digital resources. The digital resources themselves are of different types, and include full text databases, bibliographic or citation databases, multimedia electronic documents, ebooks and electronic journals. They have different search interfaces, and are more distributed. This complexity is exacerbated by differences in

- proprietary systems
- operating systems (e.g. Windows, Unix)
- local area networks (e.g. Unix, Windows NT, Novell)
- wide area networks
- database structures
- search and retrieval languages
- standards and protocols

As a result, users frequently encounter problems when they search for different information resources using a variety of query languages, different user interfaces, different protocols and different computer platforms.

5. PORTAL TECHNOLOGY

The current trend is to leverage the use of e-commerce technologies for library purposes. As more and more users begin to demand remote access to the resources of libraries, it is incumbent upon libraries to provide user-friendly interfaces for users to gain access seamlessly to all the information resources and services of the library. In this connection, libraries should coopt many of the e-commerce technologies and methodologies developed by online retailers to improve the effectiveness of their services to their users.

One major technology used by e-retailers is the "portal". The portal has many different interpretations, but its strength lies in its ability to integrate more fully the information landscape within which users operate.

The key properties of the library portal include the following:

- It should provide access to all the information resources and services of the library through a single user interface
- It should permit users to personalise or customise their access to information using push and pull technologies, so that when users log on, they only see those resources that are relevant to their field of interest (pull), and they have access to an alerting service (push) which keeps them up to date on the availability of new resources. The latter is a kind of SDI (Selective Dissemination of Information) service, except that the users develop their own interest profiles rather than rely on the librarian.
- It should permit users to communicate with librarians through the availability of email and sometimes chat facilities.
- It should provide facilities for secure payments for those value added services for which there is a charge.
- It should be available on a 24x7 basis.

6. PORTAL ARCHITECTURE

The architecture of the library portal comprises four layers, as follows:

- The Presentation Layer
- The Applications Layer
- The Protocols Layer
- The Contents Layer

6.1. The Presentation Layer

The presentation layer would be the interface that the user sees. It would be the interface with which the user interacts with the resources provided by the Library. The presentation layer could be a proprietary system using the Microsoft Windows interface but it is usually Web [illegible].sed.

In the search for an interface that will enable users to navigate an increasing complex information environment, many libraries and publishers are increasingly relying on the World Wide Web's graphical interface. It is therefore not surprising that the portal makes use of web-based technologies in its presentation layer.

6.2. The Applications Layer

The applications layer comprises a range of different types of software applications. These applications usually includes:

- An authentication system
- A search engine that can undertake distributed searching of a number of targets including Z39.50 compliant databases and web sites on the Internet. When users seek information, they are usually not concerned as to whether they are searching a Z39.50 compliant database, an ODBC database, or a web based one using HTTP protocols. The search engine must therefore have the capability of undertaking all these searches using different protocols transparently.
- Secure payments functionality
- Rights management
- A requesting module for analogue materials
- Customisation and personalisation features. This is a key portal technology. Access to information resources should be driven by user needs rather than institutional imperatives. Thus, the traditional library policy of one-size-fits-all can be abandoned. These functionalities allow the user to create a "My.Portal" or "My.Library" page, and to alway access these personalised and customised pages whenever they log on, rather than the more generic pages usually provided on library web sites.
- Chat, Email and Videoconferencing facilities, if appropriate

6.3. The Protocols Layer

Protocols are important to establish a standard communications method between the client side of the applications and the server side. The number of protocols underpinning the Internet and the Web is legion. However, the relevant ones will be Z39.50, HTTP and ODBC, as well as the Interlibrary Loan Protocol.

6.4. The Contents Layer

The contents layer includes all the "information resources" that a user or client wishes to access. These would include the "analogue books", citation or bibliographic databases, full text publications like electronic journals and electronic books, subject gateways, metadata repositories, and web sites.

6.5. The Portal Model

The diagram below provides a general concept of the library portal. Because it is a two-dimensional model, not all the complexities of the model can be illustrated.

In this model, the portal also incorporates other types of software which will enhance user access to the resources and services provided by the library. This is not a feature that is common in the use of the portal in the commercial environment. This will permit it to provide a single user-interface as well as integrate the delivery of analogue and digital information resources.

For example, if we were to integrate a piece of software such as LIDDAS (Local Interlending and Document Delivery Administration System) it will be possible for end users to have unmediated access to the resources not only of their home library, but also those of other collaborating. It would thus be possible for users, once authenticated, to use the portal to search the OPACs of participating libraries, and automatically generate interlibrary loan requests from those libraries, or they can request articles from commercial document suppliers (if permitted to do so by their host institutions).

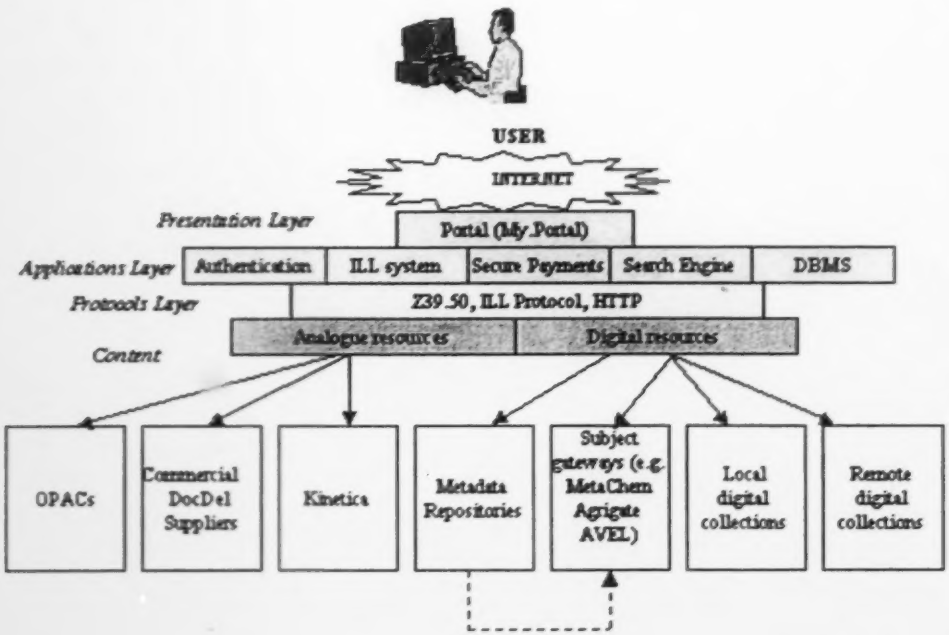
It will also be possible to integrate software such as OCLC's SiteSearch software (URL:http://www.oclc.org/oclc/menu/site.htm) in the portal so that users can undertake a distributed search of a range of databases by subject using a single set of search commands. With software such as this, it will be possible to integrate all of the library's electronic resources, search and browse multiple databases

simultaneously, and provide access to unique local digital objects, including sound and video files. At the same time, users can move seamlessly to subject gateways like MetaChem (URL:http://metachem.ch.adfa.edu.au/) which is a catalogue of chemistry resources, Agrigate, Agriculture Information Gateway for Australian Researchers (URL:http://www.agrigate.edu.au/) and AVEL, Australian Virtual Engineering Library (URL: http://www.avel.edu.au/AVEL), and also retrieve information from commercial citation or full text databases. Theoretically, the portal can provide facilities for cross browsing and cross searching of subject gateways - in the latter case via a metadata repository such as the OCLC's Cooperative Online Resource Catalog (URL:http://www.oclc.org/oclc/corc/index.htm)

In summary, via the library portal users can

- search multiple Z39.50 or ODBC compliant databases and web sites simultaneously;
- search the Library's OPAC or the OPACs of other libraries, and generate an unmediated request for a book to be delivered to their home or office;
- access contents page information and generate unmediated document delivery requests to be delivered to them electronically;
- access full text books, journals or articles via the OPAC or from citation databases;
- communicate with library staff globally, perhaps on a 24-hour basis, using email, chat or desktop videoconferencing facilities. In other words, while the portal will permit the user to customise and personalise their access to information resources, it also provides them with the human face in the virtual environment;
- obtain their information literacy skills virtually; and
- pay for access to those resources and services for which there is a charge.

PORTAL ARCHITECTURE



7. CONCLUSION

The future of content is clear. In the next five to ten years, it will comprise a mix of analogue and digital resources. Some of these resources will be available from the desktop, and others via portable handheld devices like PDA's, eBooks and mobile phones. The way to manage this mix of analogue and digital resources is to use the e-commerce paradigm of online retailers, particularly the portal.

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Using the portal, users will not be required to go to a physical library, unless they choose to do so, to get access to an analogue book. All they need to do is to generate a request via the library portal, and the book will be delivered to them either by post or in digital form via the Web or as an email attachment. They may be required to pay a fee for this service, with payment being made via the library portal. This payment could be in the form of "virtual" cash made available to them by their home institution. Via the portal also, users can launch a single search query without having to worry whether the information they are seeking can be found in an online catalogue, a citation database, a full text publication, or a web site. Via the portal, they will be able to communicate with librarians to obtain help.

This model of delivery assumes that libraries will still be needed as the intermediary between the user and the world's recorded knowledge. Would this continue to be true? With the availability of computer networks would users need to rely on libraries to provide them with access to the information that they need? As Borgman (2000, p.207) has pointed out:

> "Computer networks offer a wealth of new opportunities for providing access to information, so much so that the continuing need for libraries is being questioned. The real question is not whether libraries are needed, but how best to provide access to information in a networked world and how best to support the marketplace for ideas."

The power of electronic communications will cause a major structural change in the distribution of goods and services. We have all heard of the success stories of many e-commerce operations in the USA, and these are also some successful operations in Australia. There is now a belief that the traditional bricks and mortar retailers will eventually succumb to the nimble e-commerce merchants of the Web. We should not be therefore be surprised if libraries will also be affected.

The Bulletin in its January 18, 2000 issue speaks of a new generation of users, whom they call the e-generation. Individuals in this generation possess several characteristics that we should be aware of. They have a high level of computer literacy, are time poor and are constantly looking for convenience. They want to bridge geographical separation and look to technology to do it. They want to do their everyday transactions using their own resources at a time that suits them. This is the generation that is attracted by the flexibility of flexible learning, this is the generation that has a very short attention span, this is the generation that wants information instantly, and this is the generation that will determine the future of libraries. However, with the correct delivery strategies, it is unlikely that libraries will be faced with the horrifying prospect of "the last book" and their own eventual demise.

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